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This study presents 95 recommended experimental and 180 calculated values of critical pressures for saturated and unsaturated aliphatic hydrocarbons. This is the third article in a series dealing with recommended critical data for organic compounds. Previously critically evaluated data on normal boiling temperatures based on recommended experimental data base is also given in this study.

A comprehensive database on physical properties of ionic liquids, which was collected from 109 kinds of literature sources in the period from 1984 through 2004, has been presented. There are 1680 pieces of data of physical properties for 588 available ionic liquids, from which 276 kinds of cations and 55 kinds of anions were extracted. The correlation of melting points of the two most common systems, disubstituted imidazolium tetrafluoroborate and disubstituted imidazolium hexafluorophosphate, was carried out using a quantitative structure-property relationship method.

A comprehensive critically evaluated compilation of the most accurate wavelength measurements for classified lines of neutral mercury (Hg I) for both the single isotope ^{198}Hg and for mercury in its natural isotopic abundance has been prepared. Data from 12 sources spanning the region 1849 to 40 050 Å are included for ^{198}Hg. Data from 39 sources spanning the region 745 to 64 918 Å are included for the natural isotope mixture. Based on these line lists we have derived optimized values for the energy levels of neutral mercury for both ^{198}Hg and the natural isotropic mixture. Tabular data for 105 classified lines and 60 energy levels are provided for the natural isotopic mixture.

A new thermal conductivity equation $\lambda=\lambda(T,\rho)$ in a multiparameter format was developed for carbon dioxide through the application of an optimization technique of the functional form. The proposed equation is valid for temperature from the triple point (T_t=216.592 K: P_t=0.51795 MPa) to 1000 K and pressures up to 200 MPa. The calculation of density, which is an independent variable of the equation, from the experimental (T, P) conditions is performed with a high accuracy equation of state for the fluid.

The recommended vapor–liquid equilibrium (VLE) data for 18 binary mixtures of alkanols with alkenes and alkynes have been selected after critical evaluation of all data reported in the open literature up to the end of 2003. The evaluation procedure consisted in combining the thermodynamic consistency tests, data correlation, comparison with enthalpy of mixing data, and comparison of VLE data for various mixtures. The data were correlated with Wilson equation as well as with equation of state appended with chemical term (EoSC) proposed by Góral.

A new reference-quality correlation for the viscosity of methanol is presented that is valid over the entire fluid region, including vapor, liquid, and metastable phases. The resulting correlation is applicable for temperatures from the triple point to 630 K at pressures up to 8 GPa.

A comprehensive review is presented of experimental data on the limiting activity coefficients γ_1^{∞}, infinite dilution partial molar excess enthalpies $\bar{H}_1^{E,\infty}$, and heat capacities $\bar{C}_{p,1}^{E,\infty}$ of lower 1-alkanols (C_1-C_5) in water. For each alkanol, the compiled data are critically evaluated and correlated with a suitable model equation providing adequate simultaneous description of the equilibrium measurements and the calorimetric information. Evolution of the various infinite dilution thermodynamic properties of aqueous 1-alkanols with temperature and homologous series is briefly discussed.

Bone is a structurally complex material, formed of both organic and inorganic chemicals. The organic compounds constitute mostly collagen and other proteins. The magnitude of solubility is temperature and pH dependent. Bone is sparingly soluble in most solvents.

A new, expanded tabulation of the atomic transition probabilities for allowed and forbidden lines of Fe I and Fe II, based on the critical evaluation of all avaliable literature sources, is presented. The compiled data are taken mainly from recent experimental and theoretical results that became available after the publication of our first compilation in 1988.